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Corporate Waste Management:
What practices do leading MNCs' implement?

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ABSTRACT

Waste production and management is a topic of great social and political interest given its link to environmental deterioration and current trend towards sustainable lifestyles. In this context, corporate behaviour, especially of multinational companies (MNCs), is looked at. The objective of this study is to assess MNCs' waste management (WM) policies, identify which type of waste companies prioritise and, based on this, 'best practices'. Based on the qualitative analysis of practices implemented by four MNCs ranked as sustainability leaders, findings show companies focus on emissions and solid waste. Techniques applied involve transitioning to renewable energy, improving energy efficiency, replacing plastic and implementing recycling schemes; focusing on the main type of waste generated. On the other hand, efforts towards better water use and wastewater generation are not widespread. The study contributes to existing research about corporate sustainability, specifically on WM, and provides examples for companies introducing or improving their WM policies.

Keywords: Waste management, Waste minimisation, MNCs, CSR, Sustainability

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1. INTRODUCTION

Waste dumped worldwide is calculated at 2.12 billion tons per year and is expected to keep increasing (TheWorldCounts, 2020). Companies generate different types of waste depending on their industry and operations; usually classified by type into air emissions, solid waste and wastewater (Nikolaou, Shaun, & Skouloudis, 2018) and/or by utility (CIPS, 2007). In this context, multinational companies (MNCs) have greater impact on the environment due to the scale of its operations; and they may also influence peers by promoting the adoption of sustainable policies, thus acting as a diffusion factor. This is especially relevant where environmental legislation is lax but also considering values, corporate and personal, and stakeholders' expectations are among the strongest motivators for implementing such practices (Levidow, Lindgaard-Jørgensen, Nilsson, Alongi Skenhall, & Assimacopoulos, 2014).

Corporate waste and its handling have been topics of recent debates, linked to the increasing social concern about environmental deterioration and the planet's sustainability (O'Neill & Volkman, 2019). Surveys reflect people's interest in sustainable consumption and expectations that both businesses and governments act upon it (European Comission, 2020); while additional research shows top managers increasingly manifest conscious attitudes towards their activities' impact on the environment, but that cost-benefit analysis of modifying practices delay their improvement (Zutshi & Sohal, 2003). This context has led to the development of theory and research about corporate social responsibility (CSR), a concept that examines corporate role and responsibilities within their communities but for which there is not an agreed unique definition (Dahlsrud, 2008). Waste management (WM) can be placed within the study of CSR, mainly related to resource optimisation and environmental protection (Leblanc, 2019). When studying corporate behaviour, there are multiple ways to assess companies' sustainability. In relation to WM, techniques include reducing the overall use of resources, reusing existing ones and recycling those which no longer work for their original purpose; in this way linked to the concept of circular economy. Another important aspect is how waste is disposed when none of these options are possible (Amorim, de Nardi, & Del Nery, 2007). As to how companies measure their WM performance, this can be done using quantifiable metrics (e.g., tonnes of gas emissions, paper, plastic) and/or measuring the impact of process modifications with a long-term perspective (Cheremisinoff & Bendavid-Va, 2001). Finally, companies usually disclose their policies and results but with differences in terms of format, content and focus (Guthrie, 2016).

Based on the above mentioned, the purpose of this paper is to analyse waste management practices implemented by the most sustainable MNCs. Specifically, the objective is to identify 'best practices', see which type of waste companies pay most attention to, and how they measure their WM efforts. This assessment will allow to identify similarities and differences among leading sustainable companies' approach to the issue, as well as obtain insights on the motivations to implement such policies. For this, the selected methodology is the qualitative analysis of these companies' latest sustainability reports. Previous studies have been carried out about corporate performance in CSR actions altogether or sustainability reporting practices, focusing on differences in their content, scope, quality and motivators. These have centred on the difficulties of standardising reporting practices and making comparisons across companies, industries and/or countries (White, 2015). This thesis differs

in scope because its objective is to analyse practices reported within such disclosures and only those related to waste management. In addition, its focus is not on assessing sustainability reports themselves but using them as the primary source for identifying leading practices related to WM, driven by the acknowledgement of the increasing relevance and interest in the topic.

A review of the theory and existing studies on the wider topic of CSR and sustainability reporting is needed to contextualise the thesis' topic and assess reports' reliability for evaluating WM performance. This, combined with the presentation of definitions, types and strategies related to corporate waste management will allow a proper analysis of the selected companies' results. Thus, the remainder of this study starts with a literature review about CSR, corporate waste and sustainability reporting to contextualise the thesis' area of study. This is followed by a description of the methodology, sources and sample used to analyse WM practices; after which results are introduced reviewing each company individually and also consolidated findings. Finally, the thesis' conclusions are presented.

2. LITERATURE REVIEW

The concept of CSR is closely linked to that of sustainability, and although they are frequently used as synonyms it is important to clarify their difference. Sustainability relates to the acknowledgement that current lifestyles and activities have implications on future generations' living standards and access to natural resources to meet their needs; addressing the issue of how not to jeopardise it (White, 2015). The concept involves environmental, economic and social concerns; and has become a key topic in the global political and economic agenda. This trend has also reached businesses, influenced by social demands for them to assume a proactive attitude for promoting sustainability and be accountable for their activities' impact. In this context, CSR is understood as the way firms address the relationship between their profit-generating activities and their consequences on the environment, workers' rights, consumer protection, corporate governance and social issues (e.g., poverty, healthcare) (Savitz, 2014). However, the discussion about the difference between sustainability and CSR is beyond the scope of this study. They will be used interchangeably, mainly recurring to CSR as the focus is on corporate behaviour.

Due to its scope, corporate sustainability is frequently associated to the 'Triple Bottom Line' (TBL) concept proposed by Elkington in 1994. He suggested companies' performance should be assessed by their social and environmental impact, in addition to financial results, because they use these three types of resources in their activities. Defending a stakeholder conception of business, he proposed sustainable enterprises are those achieving positive results in these three lines by adopting a '3Ps' perspective: planet, people and profit. As to how to accomplish it, Elkington proposed two types of strategies: minimisation (of the negative impact of business activities) and optimisation, a more ambitious approach that generates benefits along the three 'bottom lines' (Savitz, 2014). The TBL framework has strongly influenced the development of CSR theory and practices, as well as the way companies report their sustainability policies (Michaelson, Waring, & Naudé, 2016).

2.1. Corporate Social Responsibility

The relevance of CSR is virtually uncontested nowadays, but there is still no agreed definition of the concept or a standardised approach towards it (Dahlsrud, 2008). This generates debates among academics and managers about how companies should behave, leading to diverse CSR policies among firms. The first debate originated from the discussion about businesses' main purpose and role in society. In this sense, the proposition that firms should only focus on maximising revenue and profit for shareholders opposed the idea they should also contemplate interests of, and impact on, other stakeholders; therefore, corporate responsibility actions were unnecessary. Eventually, the stakeholder approach became the prevalent conception among managers and theorists; and supporters of the shareholder view even reconsidered their position once research showed CSR policies can also maximise shareholder value (Mackey, 2018). However, there are still discussions about how to balance multiple stakeholders' expectations, corporate drivers for implementing a CSR plan and how to analyse companies' results (Michaelson, Waring, & Naudé, 2016).

Explanations for the expansion of CSR awareness and practices are multiple and interconnected. One of the main ones is the increased social interest in the topic and identification of market niches based on consumers oriented to sustainability (e.g., the 'Lifestyle on Health and Sustainability', LOHAS, segment). In this context CSR is understood as a response to stakeholder's expectations for greater corporate transparency and accountability (Aluchna, 2017). Campbell (2006) defined CSR drivers as 'institutional conditions' that determine corporate sustainability policies and performance. For him, the adoption of a CSR plan depends on internal and external factors like the firm's (financial) situation, legal requirements, industry-level regulatory mechanisms (formal agreements or peer pressure), non-government organisations (NGOs) actions and consumer trends. But he warns analysing companies' behaviour is challenging given the multiplicity of factors involved and variations by country, industry and time period.

Research attempting such analysis shows CSR policies vary depending on the firm's industry and its hierarchical assessment of stakeholders. This results in different structures, focus and scale of intervention (Vohra & Sheel, 2012). They can be broadly classified into altruistic (with a philanthropic approach), ethical (based on moral standards) and instrumental-strategic (if they aim to contribute to corporate goals) (Roszkowska-Menkes, 2017); with the latter associated to the 'triple bottom line' framework. Strategic policies are considered the most efficient because they can generate both corporate and social value (Jonker & de Witte, 2006). Among the latest propositions related to strategic CSR is the idea of 'Creating Shared Value (CSV)' introduced by Porter & Kramer (2011). It is presented as a new way of conceiving business activity, linking its success with social progress by addressing communities' needs to create corporate value and profit. CSV is not based on the idea of firms sharing their economic value, but on the understanding that associating private and social success generates value for both without increasing corporate costs. Supporting the development of the communities firms operate in will benefit them through improved efficiency, innovation and productivity; resulting in a virtuous circle linking corporate success and social development. Since its presentation, CSV discussions have spread and it is increasingly included in CSR policies and reports (Lee, 2019).

The perspectives mentioned above help to understand the existing variety of policies related to CSR. Given there is no single approach to the topic, the disclosure and reporting practices related to it also generate debates and considerations to bear in mind when assessing companies' actions and performance (Hahn & Kühnen, 2013), reviewed in section 2.3.1.

2.2. Waste Management

Corporate waste can be understood as by-products of business activity with little value, if any; representing a loss of resources and money, and therefore production inefficiencies (Cheremisinoff, 2003).

There is not a single method to classify waste produced by companies. By type, it can be grouped into air discharges (emissions), solid waste (hazardous and non-hazardous) and wastewater (Woodard & Curran, 2006). By potential utility, waste can be classified in four groups (CIPS, 2007). The first includes worn materials still useful for their original purpose, even after repair. The second category contains worn or by-products that can be used in their current state for a purpose other than the original without undergoing a recovery treatment, in the same industry or another. The third one includes objects fit for reuse only after a specific modification process, for their original or alternative purpose; while the last category covers products or substances without potential use that need to be disposed.

WM policies can be approached from different perspectives, but they all share the objective of improving corporate eco-efficiency by mitigating waste's negative effects on the environment and social wellbeing. In practice, WM includes all activities linked to monitoring and controlling waste generation, storage, collection, transportation and disposal (CheaperWaste, 2020). As there is no standardised process for managing waste, companies ultimately define their policies discretionally. However, Cheremisinoff (2003) identified two main ways businesses approach it. The first focuses on controlling and reducing waste impact with 'end-of-pipe' techniques to decrease its volume and toxicity, or keep it within any existing legal limits. This requires ongoing disposal activities and does not eliminate waste generation itself. In contrast, a preventive approach seeks to eliminate the production of waste by optimising operations. This can sometimes be achieved through simple operational modifications and improved internal 'housekeeping'; but in other cases it requires a thorough assessment of production processes to identify potential modifications. It may also require high initial investments and time adaptation but it still considered more financially and environmentally efficient than a control approach (Cheremisinoff & Bendavid-Va, 2001).

The type of strategy implemented derives from companies' approach to WM and are usually grouped into three types: reduction, recovery (including product modifications) or disposal (Nehrenheim, 2015). To decide the specific management techniques a tool widely used is the 'waste hierarchy', which presents up to six types of methods organised from the most to the least efficient in terms of sustainability (CheaperWaste, 2020). This is usually complemented with a preliminary audit to identify the volume and type of waste a company generates, as well as which processes produce the most. An audit's main goal is assessing opportunities for the firm to improve its efficiency and sustainability performance by modifying operations and decreasing waste generation (Woodard & Curran, 2006). In some cases, an

environmental management system (EMS) is introduced to perform the audit because it provides guidelines and a specific framework to understand internal operations, systematically monitor performance and spot areas of improvement. EMSs support waste prevention policies because they seek greater operational, financial and eco-efficiency; but efficient audits can be completed without them. Currently, the best-known and widely-applied EMS is ISO 14001 (ISO, 2019). Once an audit is carried out, a company is better positioned to define WM techniques balancing its capabilities and resources; following the priority proposed by the 'waste hierarchy' shown in Figure 1.

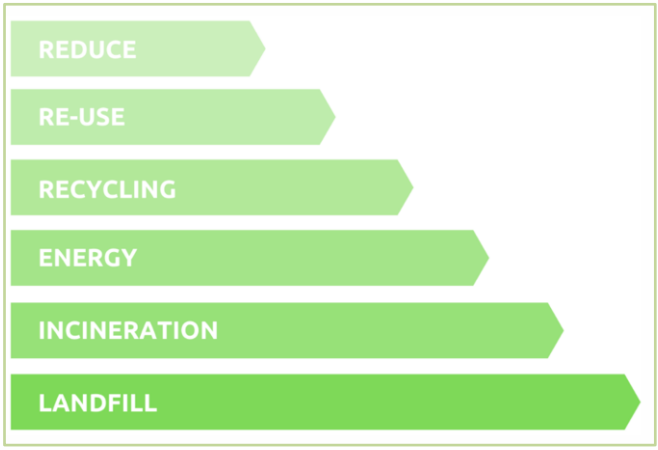

Figure 1. Waste Hierarchy

Source: CheaperWaste (2020)

According to CheaperWaste (2020), the first option should be waste prevention (reduce), which means reducing the generation of waste from its source. It is deemed the best alternative because it benefits the firm, surrounding communities and the environment. It is less focused on waste control and post-treatment practices and more on identifying replaceable processes with technologies that avoid generating pollution and undesirable by-products. Successful prevention techniques are more cost-effective but not always easily, fast or cheaply implemented. Although sometimes waste prevention can be achieved by finding substitutes for toxic substances, switching to 'green' technologies and using recyclable materials; in other cases it involves long-term planning and analysis to re-engineer internal operations (Cheremisinoff & Bendavid-Va, 2001). The second-best option is 'reuse': using worn (by-)products without modifications for another production cycle or purpose, thus extending their life cycle. If the product needs alterations, then the technique used is recycling. This implies converting waste to reusable materials for the same or alternative process (by the same firm or third parties) through a mechanical or chemical treatment; typically applied to paper, glass, aluminium and plastics (CheaperWaste, 2020).

If the options above are not viable, the best following alternative relates to resource recovery through energy-to-waste techniques. These usually include methane production from organic waste, fermentation of waste oils into biodiesel or incineration to recover energy and offset waste generation costs (Nehrenheim, 2015). When energy recovery is not possible, the final option is disposal. Within this the preferred option is incineration, as it neutralises waste by reducing its volume and/or toxicity and converts it to gas or ashes before final disposal (Cheremisinoff, 2003). If incineration is not available, then landfill disposal is used. This

needs to be a safe, final and permanent location for waste carefully prepared to avoid toxic leachate to soil and water courses; as well as air emissions into the atmosphere (Nehrenheim, 2015). Ultimately, firms decide their WM policies combining technical, regulatory and environmental considerations while balancing their costs with potential efficiency gains (Cheremisinoff & Bendavid-Va, 2001).

The WM hierarchy relates the idea of a circular economy; defined as a restorative industrial structure that regenerates natural systems, basing economic growth on social benefits and reducing economic activities' impact on existing resources. It proposes transitioning from a linear model to one focused on resource reintroduction to economic cycles, that treats waste as a new resource and ultimately generates a zero-waste system. Creating a circular economy requires material and ecological efficiency, achieved by extending materials' lifespan and reducing existing products' carbon footprint. And to achieve it, the techniques included in the 'waste hierarchy' proposal are especially useful (Gosh, 2020).

2.2.1 Waste Management Measurement

Measuring waste reduction and efficiency may be challenging because methods vary depending on the type of waste, management technique (Zorpas & Lasaridi, 2013) and firms' assessment focus: reductions from operational modifications (e.g., materials' replacement, recycled output) or from process substitutions and technological updates (Cheremisinoff & Bendavid-Va, 2001). According to Zorpas and Lasaridi (2013), once this focus is decided companies can measure their waste reduction using the following techniques:

1. Quantification (volume variation)
2. Cost analysis: implementation costs of a certain technique and the potential savings (in financial, social and environmental terms)
3. Indicators: prevention potential versus method's effectiveness (e.g., waste generation per employees; ton of waste per dollar paid as wage)
4. Resource productivity ratios

2.3. Sustainability Reporting

Sustainability reporting generally follows a triple bottom line conception by the way it organises its content. Corporate results are typically grouped in 'environmental', 'social' and 'governance' sections, for which they can also be referred to as ESG reports. The first two correspond directly to TBL dimensions, while its financial one is included in reports' 'governance' section together with details on CSR policies design and review. Sustainability disclosure has the objective of communicating relevant information for understanding a company's long-term economic value and contribution towards a more sustainable economy; for which it assesses its performance all ESG dimensions (Guthrie, 2016).

Its practice is still mainly voluntary, encouraged by multiple drivers (Horváth & Pütter, 2017). One of the main ones is the increasing demand for corporate transparency from stakeholders such as consumers, governments and investors (White, 2015). This stems from new ways of conceiving companies' role in society, as well as the development of international forums and

organisations promoting corporate accountability and commitment to sustainable practices; such as United Nations (UN)'s Sustainable Development Goals (SDGs), 'Corporation 2020' Forum or the Carbon Disclosure Project (CDP). Additional tools, frameworks and guidelines also support sustainability reporting; especially the Global Reporting Initiative (GRI), International Integrated Reporting (IIR) Framework or Economics of Ecosystems and Biodiversity (TEEB) valuation system (Guthrie, 2016). Governments have also been expanding regulations and requiring companies to disclose environmental impact analysis, products' hazardous components and their ecological consequences (Menell, 2018).

According to Barker (2019), drivers can be classified by type into legal, economic and conventional. The first refers to disclosing obligations required by regulatory authorities (if applicable). The second is linked to the legitimacy theory, according to which companies are 'allowed' to exist because their surrounding community considers them legitimate. If their social impact threatens this legitimacy, there is an economic reason for implementing and disclosing sustainable actions to recover it and sustain profit-making operations. In this context, reporting is encouraged when a company establishes sustainability as a core value that supports its legitimacy but also if it operates in an industry considered harmful; obtaining its legitimacy by demonstrating efforts to counteract its impact. Finally, the conventional driver is associated to the institutional theory proposing corporate behaviour is shaped by social norms and institutions; values, beliefs or peer pressure rather legal obligations. Barker's framework complements previous studies on sustainability reporting motivations considering the legitimacy, institutional and signalling theory (see Hahn & Kühnen (2013)).

Considering their source, main external drivers are media exposure and investors' demands, especially institutional ones requesting comprehensive information before making a decision. Regarding internal drivers, sustainability reporting was found to be more widespread among companies with sustainability committees in their Board of Directors because this reflects CSR is considered a key aspect of the firm's activity. Disclosure is also frequently linked to the implementation of ISO-certified EMSs as they facilitate a systematic monitoring of sustainability progress. But firms may also opt for alternative frameworks or create their own internal mechanisms to organise sustainability reporting, as the driver is having any defined structure that organises and facilitates disclosure (Nazari, Herremans, & Warsame, 2015).

As for the benefits of reporting, beyond compliance with any existing legal requirements it acts as a communicating tool for stakeholders and corporate governance structures. It also supports competitiveness analysis and benchmarking to design firms' strategies (Guthrie, 2016). Approaching sustainability reporting as a systematic and recurring exercise allows corporate self-assessment, identifying its strengths and weaker areas. Many companies which started reporting their CSR actions voluntarily identified a positive link with financial performance (White, 2015), and were able to leverage it to promote their competitive advantage, image and reputation. This resulted in increased consumer loyalty and employee motivation, commitment and productivity (Zsóka & Vajkai, 2018). In sum, reporting benefits can be grouped into internal (organisational), operational and external. Internal benefits relate to organising the firm around a clear and consistent vision and objective, then transferred to its CSR policies. Operational benefits involve the way activities are structured to optimise resources, allowing financial and communicational gains. Finally, external benefits relate to corporate reputation and stakeholder value (Conaway & Laasch, 2012).

2.3.1 Discussions and Development

As sustainability reporting is still considered a recent practice there are ongoing discussions about certain topics. Starting with the conception of the disclosure itself, it is frequently compared to financial reports following strict and developed accounting standards and regulations. The resulting issue is how (or if) to combine sustainability with financial reporting features to allow an easy comparison between companies following an agreed format, content and interpretation; as well as the transition towards integrated reports containing both financial and sustainability information (Barker, 2019). There are different options for their organisation, but there is no consensus on how to standardise the disclosures of diverse CSR policies for which a qualitative assessment is better suited than an accounting-based one. As a result, sustainability reports are frequently called 'non-financial reports' and prepared separately to financial ones (Guthrie, 2016).

Regarding focus, reports tend to be industry-specific and oriented to companies' most relevant stakeholders. This is assessed by each firm individually and consequently leads to variations in the reporting method, publication channel and highlighted information. Another technical limitation is the report's scope in terms of corporate boundaries: as whether it covers only the parent company or also subsidiaries, partners and suppliers is a discretional decision (Guthrie, 2016). Additionally, there is no current agreement at an industrial, national or regional level about format; leading to reports differing in structure, quality, content and focus (Horváth & Pütter, 2017). However, a current trend is the expansion of the GRI framework to guide reporting given it is comprehensive, clear and flexible; allowing firms to adapt it to their context and industry. GRI provides guidance for disclosing and fosters organisational transparency about financial and ESG performance. This is based on a framework organised in different levels and specific definitions of the information and metrics to be used for corporate assessment (Conaway & Laasch, 2012). Despite its extensive application has contributed to standardising firms' reporting practices, it has less clearly promoted an easier comparison between companies due to the flexibility and industry-specific content it contemplates (Boiral & Henri, 2015).

Finally, there have been questionings about the legitimacy of sustainability reports' purpose, and whether they actually aim to reflect corporate efforts and beliefs or just improve a firm's image (i.e., 'Greenwashing'); but there is consensus to accept they demonstrate corporate sustainable performance (Papoutsi & Sodhi, 2020). There has also been scepticism about trusting the information reported, resulting in the increasing importance of external audits and endorsements. Companies can choose between certifications (e.g., B-Corporations, ISO 14000/9000 series), frameworks to guide disclosure (GRI, Sustainability Integrated Guidelines for Management (SIGMA)) or external auditors like NGOs, governments and consultant agencies (White, 2015). External auditors can also be parties associated to financial assessments and activities (e.g., Bloomberg, Morgan Stanley, Dow Jones), who elaborate indices upon ESG scores to evaluate companies (Papoutsi & Sodhi, 2020). Each assurers' methodology may lead to differences in assessment focus and criteria, but their sponsoring of reports is recognised as a source of credibility (Adnan, Hay, & van Staden, 2018).

Despite the issues mentioned above, sustainability reports can be regarded a reliable and useful source of information to assess companies' CSR performance for two main reasons.

First because despite the lack of universal agreement about how and what to report, since the first sustainability reports were published there have been advances towards a systematic approach of disclosing corporate data; and they are increasingly used as a source of information, evaluation and communication for companies and its stakeholders (Guthrie, 2016). Secondly, recent research evaluating the validity of sustainability reports concluded they are a trustworthy source to evaluate company performance and CSR commitment. It rejected 'greenwashing' claims and found reports reflect real sustainability contributions, associated to a 'signalling' theory, defending its value for assessing corporate behaviour (Uyar, Karaman, & Kilic, 2020).

Thus, the analysis of sustainability reports will be carried out to answer the research questions guiding this study:

1) Which waste management practices do leading sustainability MNCs apply?
2) Which type(s) of corporate waste is prioritised?
3) How do these MNCs measure their results and performance?
4) What are the mains similarities and differences in approach, policies and results within the sample?

3. METHODOLOGY

The methodology chosen is qualitative; specifically, assessing annual sustainability reports. The applied method is content analysis, as it proved useful in previous research assessing corporate behaviour and 'best practices' (see e.g., Herreman, Nazari, & Mahmoudian, 2016; Nawaz, Linke, & Koç, 2020). Variables specifically considered in the analysis are presented in Table 1.

Variable	Definition/Description
WM practices	Formal policies, initiatives and programmes implemented by companies specifically related to corporate waste production, management and/or disposal.
Type of waste	Waste classification into emissions, solid waste and wastewater.
Measurement Method	Metrics and techniques used by companies to measure policies' results and their overall WM performance
Results	WM policies' outcome and progress, based on companies' measurement methods and compared to the previous year's values.

Table 1. Analysed variables

Source: Own elaboration based on literature review

3.1. Sample Selection

Companies were chosen from a ranking to select those regarded as most sustainable. As rankings provide a hierarchical classification, they are a more appropriate criterion than, e.g., size, framework adherence, industry, revenue or country. Specifically, they were selected from a global ranking published by Corporate Knights (CK) Magazine. This is a sustainability classification based on a comprehensive assessment of social, economic and environmental performance; in which corporate waste is specifically considered (CK, 2020a).

The sample is made up of the first and last two companies listed in the 'Global 100 Most Sustainable Corporations in the World' (hereinafter, 'Global 100') ranking: Ørsted A/S, Chr. Hansen Holding A/S, Kesko Corporation and Amundi SA respectively. As all companies in it are considered sustainability leaders, the decision to select those in opposite ends is based on the assumption it may allow a better comparison of WM practices. The size of the sample responds to the objective of studying practices in depth. Its analysis is organised as follows: first an assessment of each company starting with an overview of their profile and CSR policy; followed by the analysis of WM initiatives and their results. Based on this, a second stage involves a cross-case analysis of the sample to compare and contrast approaches, policies and results with the objective of identifying 'best practices' and companies' priorities.

3.2. CK's 'Global 100 Most Sustainable Corporations in the World' Ranking

CK is a Canadian magazine founded in 2002 that also has a research division dedicated to sustainability ratings, investment tools and supporting external research projects (CK, 2019). In 2012, it founded the 'Council for Clean Capitalism' as a multi-industry group that promotes economic and social policies rewarding responsible corporate behaviour and 'clean' capitalism. The magazine is today one of the largest ones about sustainability and corporate responsibility (CK, 2020a). It was also the first print business magazine and research firm to obtain a 'B Corp' certification, awarded to businesses meeting strict standards of social and environmental performance, public transparency and legal accountability (B Lab, 2020).

Its Global 100 ranking is presented annually since 2005 during the World Economic Forum (WEF) in Davos and published in channels like Globe and Mail and Washington Post (CK, 2019). For the 2020 edition 7,395 companies were assessed, with the 100 finalists geographically distributed as shown in Table 2 (CK, 2020b).

Region	Nr. of Companies
Europe	49
North America (USA, Canada)	29
Asia	18
Latin America	3
Africa	1

Table 2. Geographic distribution of Global 100 Companies

Source: Own elaboration based on CK (2020b)

3.2.1. Ranking Methodology

To create the ranking, the magazine relies on six values: relevance, transparency, objectivity, comparability, engagement and stakeholder feedback. The first one aims for results to be representative of business sustainability globally. This is complemented by transparency, achieved by disclosing its methodology and results, and objectivity, for which companies are assessed using publicly disclosed information and based on quantitative data only (not requiring separate submissions). To assure comparability, CK groups companies in 97 industry sectors and compares them only to its peers. The last two values, engagement and stakeholder feedback, involve external validation. To increase company engagement CK contacts them before finalising the ranking for data verification and complementation; while feedback is requested throughout the process from a panel of sustainability experts. The overall process is organised in four stages, presented in Figure 2 (CK, 2019).

Figure 2. Global 100 Ranking Process

Source: Own elaboration based on CK (2019)

The first is identifying the starting universe, composed of all publicly listed companies with a gross annual revenue of over USD 1 billion; without geographical or sectorial considerations. Once determined, a screening is done based on the following criteria: sustainability disclosure (of at least 75% of the information needed to measure priority key performance indicators (KPIs) per industry); financial health (score of at least five using the Piotroski F-score); product category and behaviour (eliminating those considered counterproductive to sustainable development like tobacco, weapons, anti-climate change lobbyists); and financial sanctions (fines, penalties or settlements in the last four years). Before advancing to the third stage, screening 'overrides' allow companies failing the first screen to be included in the analysis if they were part of the ranking in the last two editions, have over 25% of Clean Revenue or are part of the 'Top 100 companies' in developing countries.

The third stage is scoring the selected companies based on up to 21 KPIs classified as 'universal' or 'priority' for each industry group (listed in Annex A). Among the eight 'universal' KPIs the most relevant for environmental sustainability assessment are 'Clean Revenue' and 'Sustainability Pay Link' (SPL)[1]. Clean revenue is calculated as the percentage of total revenue derived from 'clean' products and services[2]; while SPL score measures mechanisms that link senior executive pay to the achievement of sustainability targets. Non-universal KPIs are grouped under financial management (with five indicators), employee management (six),

[1] Remaining 'universal' KPIs are: Percentage Tax Paid; Pension Fund Status; Supplier Sustainability; Women in Executive Management; Women on Boards; Sanctions Deductions.

[2] Defined according to CK's taxonomy synthesising data from: Climate Bonds Taxonomy; EU Sustainable Taxonomy; SASB reporting standards; Environmental Goods and Services Sector from Eurostat; China Green Bond Endorsed Project Catalogue; Green Bond Principles; TCFD recommended climate opportunity metrics; other private rating agencies and experts' consultation.

deductions due to sanctions (one) and resource management. The one mostly related to WM is 'resource management', defined as the proportion of the following in total revenue:

- Renewable energy generated or certified renewable energy certificates (RECs)
- Emissions: of greenhouse gases (GHG), nitrogen oxide (NOx), sulphur oxide (SOx), volatile organic compounds (VOC) and particulate matter
- Water use
- Non-recycled/reused waste generated

After KPIs are calculated, they are weighted to obtain companies' final score and ranking position. Out of the 21 indicators that may be considered, 17 are weighted based on their relative impact in their industry group compared to others (so 'priority' KPIs vary among sectors); and five have fixed weights: Clean Revenue (50%), SPL (5%), Women in Executive Management (5%), Women Board Members (5%) and Supplier Sustainability Score (2.5%). The final score results from combining the value of the 'universal' and 'priority' KPIs in the industry and their assigned weight, to reach a value between 0% and 100%. The final stage is creating the Global 100 list including the top performing companies in each industry. Industry slots are based on their representation in the total market capitalisation of the ranking, benchmarked using Morgan Stanley Capital International (MSCI)'s index measuring global equity-market performance ('All Country World Index', ACWI) (Mitchell, 2020).

This ranking was chosen to select the sample because of its reputation as a reliable source for assessing corporate sustainability; its clear and objective approach to analysis and results' disclosure, which has led to previous studies also using it as a benchmarking tool and data source (see Pal & Jenkins, 2014; Ogrean & Herciu, 2018; Sroufe & Gopalakrishna-Remani, 2019). In addition, KPIs included in 'Resource Management', 'Clean Revenue' and 'Sustainability Pay Link' are linked to waste management activities. Considering their weight on the ranking's final score, these represent around 65% of all KPIs: 50% for Clean revenue, 10% for resource management (average) and 5% for SPL. Thus, they can be considered a good indicator of firms' WM performance and source for the sample.

4. RESULTS

4.1. Individual Cases

4.1.1 Ørsted A/S

Ørsted is an energy company based in Fredericia, Denmark, founded in 1973 as DONG (Danish Oil and Natural Gas) by the Danish government. In 2006 it merged with eight private companies and transformed into a comprehensive energy firm. It started an operational restructure in 2008 to gradually phase out fossil fuel activities and transition into a 'green' energy company. This was fully achieved in 2017 after selling its oil and gas branches and maintaining only operations on renewable energies; changing its name to Ørsted. It currently has 6,500 employees and an annual revenue of EUR 9.1 billion (2019) (Ørsted, 2020a). Ørsted became a publicly listed company in 2016, but the Danish State is still the majority shareholder (Milne, 2016). The company is present in North-western Europe procuring,

producing, distributing and trading energy; and also launched a solar energy project in the USA. Its operations are organised in three segments: wind power (developing and operating wind farms); bioenergy and thermal power (generating electricity and heat); and distribution and customer solutions (purchasing, selling and distributing energy) (Reuters, 2020).

CSR Policy and Reporting

Ørsted's CSR policy includes 20 activities organised in three categories presented in Table 3 and designed to contribute to UN's SDGs (presented in Annex B); especially 'Clean and affordable energy' and 'Climate action' (Ørsted, 2019):

Climate Science Alignment	Green Energy Transformation	Responsible Business Practices
• Decarbonisation of energy generation and operations*****	• Sourcing of certified sustainable biomass*****	• Workplace safety
• Decarbonisation of supply chain and energy trading*****	• Protecting biodiversity	• Employee health and wellbeing
• Deployment of offshore wind	• Local communities	• Employee development
• Deployment of onshore renewable energy	• Resource management*****	• Employee satisfaction
• Greener combined heat and power plants*****		• Employee diversity and inclusion
• Green energy integration		• Good business conduct
• Financing green*****	** Initiatives related to waste management*	• Responsible business partners programme
		• IT and cyber security
		• Responsible tax practices

Table 3. Ørsted's CSR Policy

Source: Own elaboration based on Ørsted (2019)

Ørsted's CSR approach is mainly strategic, complemented with ethical characteristics. Its sustainability strategy focuses on social challenges relevant to the business, based on an annual assessment to identify most material ones and adjust initiatives accordingly. In this way, the CSR plan helps the business stay competitive and sustainable. To maintain its position as a global green energy company, Ørsted decided to keep investing all of its capital in green energy projects. CSR governance is designated to the 'Group Executive Management', accountable for all sustainability programmes, approving materiality assessments and proposing targets to the Board of Directors. This group is chaired by the company's CEO and organised in committees related to compliance, sustainability and QHSE (quality, health, safety and environment). In addition, climate KPIs were introduced for the CEO and CFO (financial) positions, linking their cash-based incentives to the company's share of green energy and carbon-emission's reductions.

Its reporting motivations reflect the three drivers proposed by Barker (2019). Ørsted uses it as the tool to comply with national requirements for disclosure, which follow a European Union (EU)'s Directive requiring all public companies with over 500 employees to publish a

non-financial statement (European Union, 2014). Economic factors linked to the legitimacy theory relate to the fact the energy sector is among the largest contributors to environmental deterioration; thus, reporting Ørsted's contributions to offset this legitimises its activities. In addition, the decision of shifting operations towards renewable energy was motivated by the firm's vision, values and commitment to promote green actions globally and slow down global warming. To ensure its disclosure's transparency and trustworthiness, Ørsted relies on international guidelines to assesses the impact of climate change on its operations (using Task Force on Climate-related Financial Disclosures (TCFD) recommendations) and clarifies the corporate boundary the report (Ørsted's parent company and subsidiaries controlled by it). Regarding methodology, ESG data is reported to a consolidated system using the same processes as for financial reporting. And the report is reviewed by PricewaterhouseCoopers (PwC) before publication.

Waste Management Policies and Practices

From the 20 activities in place, six are related to WM practices (marked with a '*' in Table 3). Emissions are at the centre of Ørsted efforts, with most initiatives focusing on different types of emissions, the activities generating them and the objective of reducing the firm's carbon intensity (i.e., emissions relative to the amount of energy generated). Emissions are calculated considering greenhouse (GHG) gases (CO_2, CH_4, N_2O and SF_6) and carbon emissions from burning fossil fuels (coal, oil, natural gas, diesel, petrol and fuel). Its assessment covers direct and indirect emissions classified in three types ('scopes') depending on its source, following GHG Protocol Corporate standards. 'Scope 1' considers direct emissions from operations, which in Ørsted's case includes energy generation and related administrative activities. These are released by burning coal at heat and power (CHP) plants for generating energy and also by facilities' consumption of gas and oil for their operations. To reduce 'scope 1' emissions, Ørsted's strategy is increasing the share of renewable energy produced and sold. This is being done by building new offshore windfarms, expanding the use of solar energy to run its plants or converting some of them to operate on sustainable biomass. To ensure wood used in this process contributes to reducing carbon emissions, Ørsted sources it from forestry and industry residues with no potential for timber products, and only from sustainably managed forests with ongoing reforestation. For obtaining solar energy, it launched in 2019 the 'Permian Energy Centre' solar and storage project in Texas.

'Scope 2' emissions include indirect ones generated from energy consumption in facilities, road transport, air travel and food. Initiatives implemented in this area include having all office buildings operating on green energy sourced from its own windfarms, as well as reducing heat and power consumption through energy-efficiency actions (mainly switching to LED lights). For emissions related to road transport, no new fossil-fuelled cars will be bought or leased from 2021, more electric chargers will be added to onsite parking and electric car-sharing will be offered to employees. With this, the company aims to make its entire corporate fleet electric by 2025. Air travel emissions are offset by purchasing carbon credits; with the possibility for employees to use the same corporate tool to offset their private travel emissions. Finally, emissions linked to food and drinks are being reduced by withdrawing carbon-intensive products like meat and dairy from its canteens.

‘Scope 3’ also covers indirect emissions, but those associated to the firm’s supply chain, contractors and energy trading activities. For the first two sources, efforts aim to establish carbon neutral offshore logistics by working closely with suppliers to decarbonise their manufacturing activities and vessel services. This includes optimising sailing routes, transit speeds and docking patterns; testing batteries as diesel’s supplement for hybrid vessels; charging vessels at Ørsted’s windfarms; and promoting suppliers’ disclosure of emissions and use of renewable energy. As for energy trading activities, the firm will reduce gas transactions in wholesale markets by not renewing or signing new long-term purchase contracts; and has already agreed to divest its liquefied natural gas branch.

Despite focusing on emissions, Ørsted also implements policies to improve solid waste and water management. Its solid waste is generated from working equipment and food in its facilities. Techniques used aim to reduce waste volume and eliminate hazardous waste by improving monitoring, incorporating strict requirements in contracts and fostering circular WM processes in its facilities. In addition, all buildings have ISO 14001 certifications and frequent on-site visits, trainings and monthly reporting. Regarding working equipment, sustainability criteria for procurement were introduced so that new furniture has FSC-certified wood, while outdated equipment is donated or recycled. New PCs need an Energy Star 6.1 efficiency rating and are delivered in fully recycled packaging. Facilities’ general waste is sorted for recycling, food waste converted into biogas and single-use plastic bottles were banned. In power stations processes were redesigned to reduce waste generated for incineration, while residual products like fly ash and gypsum are sold for reuse. On the other hand, water management covers withdrawal (for process use), water stress (assessing its source with WRI’s Aqueduct Water Risk Atlas) and wastewater (all discharges except cooling water from power plants, based on meter readings and invoices). Ørsted’s strategy is reducing water use and discharge volume, as well as installing filtering systems in vessels to generate fresh water from the sea and avoid plastic water bottles (saving up to 8,000 per monthly trip).

Overall, Ørsted’s policy targets the three types of corporate waste, with most of its efforts focused on emissions and its carbon footprint. The firm has established ambitious targets and invested in process’ redesign to improve its WM, aligned with its corporate and competitive strategy. For all waste types, techniques chosen are preventive rather than controlling, looking to modify operations to reduce or eliminate waste generation. For this, a combination of reduction, recovery and disposal strategies is applied aligned to the ‘waste hierarchy’ techniques. Most of them aim to reduce the consumption of unsustainable materials and waste generation, complemented with internal recycling programmes, selling its waste for reuse or using it to generate biomass and energy. As for disposal, it has improved operations to reduce the amount of waste disposed and incinerated.

Results and Assessment

Ørsted’s annual performance on WM is summarised in Table 4, presenting metrics used to assess each objective, the original target (if available) and results by type of waste (Ørsted, 2020b). Ørsted’s assesses results using quantifiable metrics of volume or weight, combined with percentual variations. In 2019, it reached its target for share of own consumption of green energy. Important advances for other targets were made in relation to carbon intensity,

coal and gas consumption, ‘scope 1’ and ‘scope 2’ emissions, avoided emissions (related to green bonds) and generation of solid waste (especially hazardous). Reducing emissions was possible due to higher generation of wind energy, which allowed a decrease in use of coal and gas in Ørsted’s plants, as well plants’ conversion to operate on biomass. Wind-based power allowed the company to avoid 40% of emissions, while biomass avoided 1.4 million tonnes of released carbon; calculated based on the assumption that these sources replace an equal amount of power generated using fossil fuels. Results contribute to the firm’s objective of contributing to climate change and reducing its carbon footprint.

In absolute terms, the firm’s best results relate to the proportion of recycled waste (especially when considering reused and composted waste), certified wooden biomass and green energy produced and delivered to customers (relative to total generation and sales). On the other hand, areas further from its established targets are ‘Scope 3’ emissions and achieving a fully electrical fleet. Despite no targets were set for water management, Ørsted still accomplished improvements. In addition to reducing withdrawal volumes, it increased the proportion of water sourced from low-stress areas and lowered that from increased stress; with no significant withdrawals from medium or high stress areas. It also reduced its discharge volume, partly supported by a new process for cleaning oil-containing water that eliminates the need for treating it as waste (reducing 1,347 tonnes of sludge for incineration).

Indicator	Target	2019 Performance
Emissions		
Total energy consumption (MWh)	-	17,558,000 (23% decrease)
Green energy generation share (%)	95 (by 2023)	86 (11% increase)
Green energy share (own consumption) (%)	100 (by 2019)	100 (14% increase)
Green energy share (of sales) (%)	-	68 (4% increase)
Carbon intensity (g CO2e/kWh)	20 (by 2023)	65 (50% decrease)
Coal consumption (tonnes)	0 (by 2023)	600 (51% decrease)
Gas consumption	-	29% reduction
Energy savings (GWh)	14 (by 2022)	8.8 (7.9% increase)
Avoided emissions from allocated green bonds, (000s tonnes of CO2e)	-	1,097 (34% increase)
Certified sustainable wooden biomass (%)	100 (by 2020)	96 (13% increase)
Total emissions (tonnes CO_{2e})	-	26,573,000 (8% decrease)
Scope 1 emissions (tonnes CO_{2e})	-	1,846,000 (47% decrease)
Scope 2 emissions (tonnes CO_{2e})	-	123,000 (19% decrease)
Scope 3 emissions (tonnes CO_{2e})	50% reduction (by 2032)	34,604,000 (4% decrease)
Share of electric vehicles (%)	100 (by 2025)	21 (introduced in 2019)

Indicator	Target	2019 Performance
Solid Waste		
Total waste (tonnes)	-	138,000 (32% decrease)
Hazardous waste (tonnes)	-	127,000 (34% decrease)
Non-hazardous waste (tonnes)	-	11,000 (14% increase)
Total recycled waste (%)	-	84 (7% increase)
Reuse, recycle, composting (% of waste)	-	98 (1% decrease)
Recovery (% of waste)	-	1 (no variation)
Landfill and incineration (% of waste)	-	1 (1% increase)
Water		
Water withdrawal/consumption (m^3)	-	1,164,000 (16% decrease)
Withdrawal from water-stressed areas (%)	-	- Low: 76 (1.6% increase) - Low/Med: 23 (1.8% decrease)
Wastewater discharge (m^3)	-	882,000 (7% decrease)

Table 4. Ørsted's Waste Management Performance

Source: Own elaboration based on Ørsted (2019)

4.1.2 Chr. Hansen Holding A/S

Chr. Hansen Holding is a Danish bioscience company that develops natural solutions for the food, pharmaceutical and agricultural industries. It divides its operations in three segments: 'Food Cultures and Enzymes' (cultures, enzymes and probiotic products to influence food's flavour, texture, shelf life and nutritional value); 'Health and Nutrition' (dietary supplements, pharmaceuticals, animal food and plant protection products); and 'Natural Colours' (colouring for food and beverages) (Insider Inc., 2020). The company was founded in 1874 in Hørsholm and currently has over 3,600 employees operating in 30 countries, reporting an annual revenue of EUR 1.2 billion (Chr. Hansen, 2020a). Its main locations are in Denmark, France, Germany and USA. The company was listed on Nasdaq Copenhagen in 1979 and again in 2010, after a 5-year period of private ownership (Chr. Hansen, 2020b).

CSR Policy and Reporting

Chr. Hansen introduced its first CSR plan in 1949. Since 2017, it is entirely organised around UN's SDGs, with 82% of the company's profit contributing to its promotion. Sustainability initiatives focus on six areas, classified under 'commercial' or 'operational' goals as presented in Table 5 (Chr. Hansen, 2019a).

Commercial Goals	Operational Goals
• Better Farming (promoting natural plant solutions to use less antibiotics/pesticides) • Good Health (promoting lower sugar consumption) • Less (food) waste	• Climate and Environment (corporate waste and energy efficiency practices) • Workplace Responsibility (safety and diversity measures) • Leading with Integrity (anti-bribery actions)

Table 5. Chr. Hansen's CSR Policy

Source: Own elaboration based on Chr. Hansen (2019a)

Chr.'s CSR approach also combines strategic and ethical characteristics. It believes it has a responsibility, derived from its market position, to lead peers and generate a collaborative environment that creates a sustainable food system. Its commitment to lead this change is based on providing solutions for responsible farming and natural products that contribute to people's wellbeing. This is why a sustainability 'mindset' is present in the firm's purpose, strategy, culture and commercial portfolio. Corporate objectives are set to meet global goals for sustainable growth, for which efforts are increasingly focusing on reducing plastic use and contributing to a circular economy. Its CSR strategy is designed by a Sustainability Board headed by its CEO, including representatives of investors, customers and public relations, products, sourcing and human resource (HR) teams (Chr. Hansen, 2019a).

Chr. Hansen's sustainability disclosure is based on legal and conventional motivations. In addition to using its report to comply with national and EU's requirements, the company manifests its will to be accountable to all stakeholders and so publishes its performance following UN's Global Compact principles. Financial and non-financial analysis covers all manufacturing facilities, adjacent offices and warehouses. Its sustainability report is based on guidelines proposed by global platforms like SEDEX, EcoVadis, FTSE, Sustainalytics and the CDP. To ensure its reliability, the company carries out internal audits and external quality validations in charge of PwC. Additional environmental assessment is performed to comply with ISO requirements related to its facilities' certifications (Chr. Hansen, 2019b).

Waste Management Policies and Practices

Chr.'s CSR priorities are promoting natural farming practices, global health and internal integrity. Still, it implements WM initiatives to improve operational efficiency and optimise resources with the objective of reducing its carbon footprint and that of its customers. Starting with emissions, although they are not a major aspect for Chr. due to its production processes, the firm has several ongoing initiatives to monitor them (based on the GHG Protocol). Regarding 'scope 1' emissions, major production sites have thresholds limiting air discharges and are regularly reviewed by local authorities. To ensure they are kept within the established limits, specific filters for each emission component were installed.

'Scope 2' emissions are mainly generated from energy consumption and transportation. In 2019, Chr. launched actions to shift reliance from fossil fuels to renewable sources, prioritising solar energy in combination with wind- and biogas-generated power. These

include installing solar panels to cooling storage units in Denmark and signing a ten-year contract with a green energy provider; and the objective of expanding similar actions to overseas operations. In addition, its ‘Go Green’ project was introduced to review energy consumption at production sites globally and identify optimisation opportunities; to eventually obtain ISO 50001 certifications on energy management. Its objective is to reduce risk and invest in energy-efficient solutions that reduce the firm’s environmental impact. ‘Go Green’ is also conceived as a platform to align foreign and domestic facilities’ practices under a single environment and energy management system. For emissions related to transportation, the strategy is favouring low CO_2-intensive options and minimising distances between production sites and customers. For this, air freight is being replaced with road or sea alternatives, all logistics operations are based on supply planning programmes to improve efficiency and suppliers are required to ship as directly and consolidated as possible. In addition, corporate cars need at least a ‘B’ classification for approval.

To improve ‘scope 3’ emissions Chr. introduced sustainability requirements to all existing and future contracts with suppliers. Before approval, suppliers must prove compliance with regulations and the existence of internal sustainability programmes, as well as allow Chr. to make quarterly and annual reviews. Chr.’s requested features include waste collection, chemical control programmes and eco-friendly transportation equipment.

Regarding solid waste, the firm operates on two levels. The first relates to global food waste, specifically of yogurt. Chr.’s contribution is channelled through its commercial activities by providing dairy producers bioprotective cultures that extend cheese, yogurt and yeast-based food’s shelf life. This helps reduce current volumes of dairy products wasted because they expire along the value chain and before reaching consumers; estimated to account for almost 10% of global GHG emissions. Thus, extending food’s lifespan reduces waste volume and also its carbon footprint. The second level focuses on corporate waste. The strategy is based on ‘upcycling’ processes to transform waste into new resources and minimise the firm’s environmental footprint; for which waste-to-resource initiatives were introduced. One of the main ones involves using grape skins discarded from wine production to create food dye, and any remainder later transformed into biogas and fertiliser (along with most of Chr.’s own organic waste). Some facilities also reuse pallets and cardboard, while others have recycling programmes for effluents, bags, plastic, glass and metal; or sell lab coats to business partners for reuse. Additional activities include an annual ‘food waste week’ to encourage efforts to reduce internal food waste and promote techniques employees can implement in their households. This was first implemented in Denmark but is expected to roll out globally. And although Chr. Hansen does not produce significant hazardous waste, it still seeks to reduce its current generation by replacing materials classified as such. For this, all new materials undergo an environmental assessment before acquisition.

The firm’s water use and wastewater generation are approached considering all sources, uses and facilities; and based on volumes recorded by metered intakes or invoices. At a corporate level, the strategy is to assess production design to improve efficiency and introduce recycling techniques. Regarding water consumption, the first initiative was producing a water scarcity map and then monthly freshwater usage reports discussed in quarterly meetings. Based on this, the company set targets for water use reduction. In addition, at some production sites non-contact cooling water is re-injected into water courses.

To reduce wastewater generation, actions vary depending on location and include soft water and reverse osmosis processes (Denmark), nanofiltration (Brazil), and clean-in-place optimisation (France).

Overall, Chr. Hansen's WM policy is focused on solid waste, specifically of food, but still covers the three types of waste. Its approach is primarily preventive and aims to reduce production waste; combined with controlling actions like setting thresholds for air emissions. This results in a reduction and recovery strategy that includes most of the 'waste hierarchy's techniques. Initiatives are designed to ultimately reduce the consumption of energy and water, as well as introduce process innovations that increase operational efficiency. Reuse techniques are applied for plastic waste (internally) and working materials (externally, by selling used lab coats). When not possible, recycling or recovery plans are applied.

Results and Assessment

Chr.'s performance assessment is mostly based on quantifiable parameters, as shown in Table 6. It monitors waste management with multiple metrics but set targets only for a few specific indicators, focusing efforts on process efficiency rather than waste volume. In general, all indicators had minor relative variations in the last year and best results were achieved in yogurt waste reduction, recycled biomass, recycled waste, 'scope 2' emissions and energy efficiency. Energy efficiency increase is linked to improved production processes, based on emissions measured according to the use of raw materials, auxiliaries and energy users (Chr. Hansen, 2020c). Although the variation in CO_2 efficiency was low, it allowed the company to reach its target of 25%.

On the other hand, results showing some deterioration are total amount of solid waste and wastewater produced, 'scope 1' and 'scope 3' emissions, and total energy consumed. However, the company expects positive future results related to wastewater once initiatives in place start delivering results. This is because it observed programmes introduced in Denmark reduced waste generation and nanofiltration in Brazil allowed the recycling of 70% of acidified wastewater.

Indicator	Target	2019 Performance
Emissions		
Energy efficiency (%, relative to 2014)	20	10.8 (2% increase)
Total energy consumption (MWh)	-	205,691 (2% increase)
Total emissions (tonnes CO_{2e})	-	139,793 (1% increase)
Scope 1 emissions (tonnes CO_{2e})	-	25,881 (3% increase)
Scope 2 emissions (tonnes CO_{2e})	-	23,558 (3% decrease)
Scope 3 emissions (tonnes CO_{2e})	-	90,354 (3% increase)
CO_2 efficiency (%, relative to 2014; scope 1 + 2)	25	26.5 (0.4% increase)

Indicator	Target	2019 Performance
Solid Waste		
Yogurt waste reduction (tonnes)	1.2 million (by 2022)	180,000 (6% increase)
Total waste (tonnes)	-	4,720 (7% increase)
Hazardous waste (% of total)	-	1 (no variation)
Recycled waste (%)	40	45.5 (4% increase)
Recycled biomass (tonnes)	-	103,527 (4% increase)
Water		
Total water consumption (m^3)	-	1,490,702 (1% decrease)
Water efficiency (%, relative to 2014)	20	6.5 (0.5% increase)
Wastewater (m^3)	-	1,150,330 (3% increase)

Table 6. Chr. Hansen's Waste Management Performance

Source: Own elaboration based on Chr. Hansen (2019a)

4.1.3 Kesko Corporation

Kesko is a Finnish company founded in 1940 in Helsinki by the merger of four firms. It started as a chain of general stores, later complemented by building specialty ones and investing in the trade of agricultural supplies, machinery and industrial operations (of bread, meat, margarine, clothing and coffee). Its stores gradually added fresh food to its offer and evolved into supermarkets. Kesko became a public company in 1960 (K-Group, 2020a), and started an internationalisation process in the 1990s by opening stores in Sweden, the Baltic countries and Russia. It currently operates as K-Group (Kesko and K-stores) in three segments: grocery (accounting for 52% of total sales), building and technical trade (40%) and automobile (8%). It has 1,800 stores in eight countries, 43,000 employees and an annual revenue of over EUR 13 billion (2019) (K-Group, 2020b).

CSR Policy and Reporting

Kesko's CSR policy is designed to contribute to UN's SDGs and, although its initiatives support all goals, they are mainly oriented towards 'Responsible Consumption and Production', 'Decent Work and Economic Growth', and 'Climate Action' (K-Group, 2018). The current corporate policy is organised around six sustainability themes and strategic actions, as presented in Table 7 (K-Group, 2020b).

Sustainability Themes	Strategic Actions
• Society • Selections and purchases • Climate and environment • Working community • Customers • Good corporate governance and finance	• Pursue leadership in circular economy solutions • Strengthen responsible and transparent sourcing • Commercialise sustainable own-brand products • Create data-based services using customer data and artificial intelligence responsibly • Expand CSR initiatives with retailers and employees • Reduce energy consumption and increase internal production of renewable energy

Table 7. Kesko's CSR Policy

Source: Own elaboration based on K-Group (2020b)

Kesko's CSR policy is based on ethical principles included in its corporate values and the mission of creating social welfare responsibly for all its stakeholders. It focuses on transparency, environmental care and social value creation with a long-term perspective and commitment; acknowledged by being included in CK's Global 100 ranking for 16 consecutive years. CSR actions and initiatives are strategically defined to support the firm's objective of sustainable growth. For example, financing agreements made in 2019 defined their interest margin based on the firm's progress on targets for carbon footprint, food waste and audits in high-risk countries. Kesko considers climate change and sustainable consumption as two of the six key megatrends directly affecting its operations[3], and sees promoting customers' sustainable lifestyle as a business opportunity. In this context, it prioritises disclosing store products' origin and carbon footprint to increase clients' awareness and offers its own-brand portfolio with sustainable alternatives. Implementing a successful CSR programme is also seen as way to attract investors, who increasingly base their decisions on ESG indicators and performance (K-Group, 2020b).

Sustainability governance is delegated to the Corporate Responsibility Advisory Board, which defines CSR principles and guidelines after discussion with the Board of Directors and Group Management Board. The CSR Board is headed by the Executive Vice President for HR, corporate responsibility and regional relations. The policy's execution is controlled by the Corporate Responsibility Unit, responsible for developing, coordinating and reporting all actions (K-Group, 2019). The unit monitors Kesko's performance using international indicators and reports results comprehensively; contemplating outcomes derived directly from its operations and indirectly from procurement and sales partners. CSR performance is measured against TBL indicators, balancing financial, social and environmental results (K-Group, 2020c). Kesko started reporting its sustainability performance in 1997. It currently follows GRI standards and benchmarks its progress against UN's Global Compact objectives (Visser & Tolhurst, 2017). For external validation, data is audited by PwC and its observations are included in the final report. In addition to disclosing information to comply with national and European Union requirements, its sustainability reporting is considered key to ensure transparency and communication with stakeholders and potential investors.

[3] Together with globalisation, digitalisation, increased customer knowledge and practice, and individual customer behaviour.

Waste Management Policies and Practices

Initiatives related to WM are mostly included in 'Selections and Purchases' and 'Climate and Environment' themes (K-Group, 2020b). Regarding emissions, Kesko also adheres to the GHG Protocol and bases targets for reduction on international summits' goals related to global warming. 'Scope 1' emissions are produced by generating electricity and heat in Kesko properties, and fuel consumption of its logistics department. The current strategy is reducing emissions by using renewable energy and improving stores' energy efficiency to become carbon neutral by 2025. Measures taken to reach this vary by type of operations and are monitored by Energy Managers. In K-stores and buildings, 34 solar panels were installed to cover up to 15% of their annual electricity consumption; with two new solar power plants in construction to double Kesko's generation capacity. In addition, an energy recycling system introduced in 13 grocery stores allows to reduce up to 95% of their heat consumption (scheduled to reach the entire retail network). For Kesko Logistics, decreasing its emissions was established as a long-term objective to be achieved by changing processes to improve operations' efficiency. This includes favouring centralised distribution, optimising delivery routes and volumes; together with reverse logistics that allow collecting products, pallets and recycled bottles on truck's return routes. Complementary initiatives include increasing the share of facilities with ISO 14001 certifications, economical driving training for drivers and renovating the corporate fleet with vehicles using renewable fuels and electric trucks. In its car division, all electricity in charging stations is generated from wind power and the firm joined the Green Deal for the automotive industry; which aims to organise collective efforts to reduce carbon emissions in the transportation sector.

Its 'scope 2' emissions are generated by new building projects, outsourced logistics, consumption of purchased energy, employees' commute and business travel. Actions in place include using only LED lights in new buildings and improving the sourcing of purchased energy. All external electricity bought in Finland is generated from renewable sources since 2017, and in 2019 Kesko started requiring suppliers to have Renewable Energy Guarantees of Origin (REGO) certificates. To encourage employees to commute in eco-friendly options Kesko designated parking and maintenance spaces for bicycles, showers and dressing rooms. And at the K-Kampus (headquarters) it introduced four shared cars: two electric, one hybrid and one multi-purpose. Finally, business travel is discouraged and employees expected to prioritise online meetings.

'Scope 3' emissions are linked to supply chain operations, production of items sold in stores, generation and distribution of purchased energy, and customers' commute to stores. Supply chain initiatives include enforcing sustainability procurement requirements, offering trainings to suppliers and auditing their operations. In 2019, audits focusing on environmental management and ISO 14001 EMS were completed for 35 Chinese suppliers. Additional assessments were done for 28 suppliers based on information about energy consumption, sourcing and efficiency policies; while 19 suppliers participated in Amfori's BEPI programme to improve sustainability in risk countries. Initiatives focusing on customers' emissions include the 'K-Ostokset' app to calculate purchases' carbon footprint (used by 100,000 clients) and onsite electric charging stations, installed in 76 stores in Finland. Kesko also contributes to expanding the use of electric cars by increasing imports of vehicles with low or zero emissions for sale by 57%.

In terms of solid waste, Kesko's focuses on plastic, food waste and energy recovery. Its plastics policy seeks to reduce its use in own-brand products' packaging, for which it modified 26 products' packaging and improved the recyclability 16 others using compostable plastic or paper. Internal R&D projects led to the removal of plastic from cotton buds (reducing annual production of plastic by 30 tonnes) and the creation of a garbage bag made from sugar cane and produced with wind power (K-Group, 2020d). These initiatives are complemented with reuse and recycling ones: collecting cardboard and plastic for new industrial processes; establishing take-back points for customers to leave packages, batteries, e-waste and clothes for recycling; and the introduction of reusable shared shopping bags. Store managers in Finland can also opt to participate in the Circular Economy Agreement and access trainings about preventing waste generation and improving recycling efficiency. Finally, the recycling network of its car division has a 99% waste recycling rate, with dealerships reporting less than 10 kg of non-recyclable waste per year.

Regarding food waste, stores' product selection and stock are based on forecast planning to ensure they match customers' demand. Special attention is paid to expiration dates, tracked by Kesko's 'ResQ Club app', allowing stores to sell at discounted prices as it approaches. Stores also use fruits, vegetables and bread close to expiration to produce jams, juices and beer; while food that cannot be sold is donated to charity or farms for animal feed. Any remaining food waste is transformed to biogas through an agreement with an external gas producer. This allows inedible food from 400 stores to be converted to energy and used to power Kesko's warehouses. Another energy conversion initiative is the annual 'Ham Trick' campaign, through which customers deposit fat from Christmas hams in stores' collection points and is later used for the production of renewable diesel.

Finally, Kesko's approach to water management involves assessing and monitoring its consumption, recognising 47% of its water footprint is generated abroad and related to products from areas suffering from water scarcity or contamination. Its objective is to carry out risk evaluations to identify scarcity or pollution issues along the supply chain and design actions plans. In addition, own-brand fruits and vegetables have GLOBALG.A.P. certification to ensure they were produced under sustainable water management practices.

In general, Kesko's WM policy is focused on emissions and solid waste. Initiatives are oriented towards waste prevention through a variety of techniques decided after assessing its operations and investing in sustainable solutions. Most of its actions aim to reduce the generation of waste, but as this is a long-term goal several techniques also involve short-term reusing, recycling and energy-to-waste activities. Water management is the least type of waste treated, and the approach is closer to a control strategy than a reduction one.

Results and Assessment

WM results include all K-Group's properties and logistic activity in Finland and stores abroad. Measurement is almost exclusively based on quantifiable metrics of waste volume but in a very detailed and comprehensive manner, as shown in Table 8. For energy consumption, total values include electricity, heat and fuel for self-produced heat. In this area, despite total consumption did not vary in the last year, the firm improved its use of renewable energy

production and consumption that allowed an increase in efficiency. As to emissions, even though 'scope 1' values increased the reduction in the other two 'scopes' outweighed it also resulted in improved emissions' efficiency. Kesko's results show an improvement in most indicators and a better WM performance in 2019 compared to 2018. Best results relate to solid waste recycling and collection of used products returned by customers. In this sense, recovery rate was 100% in Finland and 69% abroad. Positive results were also obtained in reducing hazardous waste production and increasing the generation of renewable energy through solar panels and waste conversion to biogas. On the other hand, and although they are proportionally small, deteriorations were reported for 'scope 1' carbon emissions and total volume of waste produced.

Indicator	Target	2019 Performance
Emissions		
Total energy consumption (MWh)	-	940,161 (no variation)
Renewable electricity use (Finland) (%)	100	100
Solar power production (internal use) (GWh)	-	6.8 (32% increase in production capacity)
Energy efficiency (GWh savings)	7.5% (vs. 2015)	51 (64% of target)
Total emissions (tonnes CO_2eq)	-	8,139,365 (17% decrease)
Scope 1 emissions (tonnes CO_2eq)	-	47,721 (6% increase)
Scope 2 emissions (tonnes CO_2eq)	-	72,444 (10% decrease)
Scope 3 emissions (tonnes CO_2eq)	-	8,019,200 (17% decrease)
GHG emissions intensity (in relation to net sales; tonnes CO2e /€ million)	-	11.2 (7% decrease)
Air miles (business travel)	-	8.6 million (12% decrease)
Solid Waste		
Total waste (tonnes)	-	33,739 (8% increase)
Non-hazardous waste (tonnes)	-	32,128 (7% increase)
Hazardous waste (tonnes)	-	1,611 (3% increase)
Total waste recycled/recovered (tonnes)		27,930 (10% increase)
Waste recycling/recovery (non-haz.) (tonnes)	-	26,696 (7% increase)
Waste recycling/recovery (hazardous) (tonnes)	-	1,234 (24% increase)
Landfill (non-hazardous waste) (tonnes)	-	5,432 (no variation)
Hazardous waste treatment (tonnes)	-	377 (35% decrease)
Plastic collected (own) (tonnes)	-	90 (88% increase)
Cardboard collected (own) (tonnes)	-	3,650 (9% increase)
Returned aluminium cans (million)	-	383 (1% decrease)
Returned bottles (plastic and glass; million)	-	179 (5% increase)
Returned batteries and accumulators (tonnes)	-	413 (41% increase)

Indicator	Target	2019 Performance
E-waste returned for recycling (tonnes)	-	159 (5% increase)
Circular Economy Agreement (nr. of stores)	-	664 (14% increase)
Organic waste transformed to biogas (tonnes)	-	4,800 (20% increase)
Identified food waste (tonnes)	-	17,920 (5% decrease)
Water		
Water consumption (m^3)	-	1,193,745 (no variation)

Table 8. Kesko's Waste Management Performance

Source: Own elaboration based on K-Group (2020b)

4.1.4 Amundi SA.

Amundi is a French asset management company founded in 2010 by Crédit Agricole (CA) and Société Générale (SG). It became a public company in 2015 and has since evolved into Europe's largest asset management firm, managing EUR 1,653 billion and generating an annual revenue of EUR 2.7 billion in 2019 (Amundi, 2020a). It has 4,500 employees working in 37 countries in Europe, Asia-Pacific, Middle East and America; with its main investment hubs in Boston, Dublin, London, Milan, Paris and Tokyo (Amundi, 2020b). Amundi offers investment strategies involving active, passive and real assets to retail (individual), institutional and corporate clients. Fixed income assets count for 50% of its operations, followed by multi-assets, equities and liquidity solutions (15% each); real alternative and structured assets (6%) (Amundi, 2020c).

CSR Policy and Reporting

Social and environmental responsibility are Amundi's founding pillars. Its CSR policy follows that of Crédit Agricole (parent company) and applies to all locations worldwide. Programmes and initiatives are based on the three 'commitments' shown in Table 9 (Amundi, 2020d).

Be a Responsible Financial Institution	Individual and Collective Development	Be a Community-minded, Eco-aware Citizen
• Promote responsible finance • Keep promises to clients	• HR Policies • Employer-employee communication, psychosocial risk prevention and workplace quality • Societal involvement	• Sponsorship • Responsible purchasing • Direct environmental footprint

Table 9. Amundi's CSR Policy

Source: Own elaboration based on Amundi (2020d)

Among these commitments, priority is placed in being a responsible financial institution, encouraging issuers to adopt sustainable practices and offering responsible investment options to clients. This is achieved by increasing the weighting of sustainable development and social responsibility criteria in investment policies, following Principles for Responsible Investment (PRI) guidelines. In addition, ESG analysis of investment options and green finance are the main areas of the current development strategy; based on the conviction that companies and investors are responsible for building a sustainable society and that a successful ESG approach contributes to positive financial results. In 2019, assets under responsible investment management were valued EUR 323.5 billion (20% of total), representing an annual increase of 17% (Amundi, 2019). Amundi introduced a three-year action plan to completely integrate ESG assessment to all management practices by 2021. This involves rating all assets based on their ESG performance on a scale from A (highest) to G (lowest), following UN, OECD and International Labour Organisation (ILO) guidelines. In 2019 over 8,000 issuers were analysed with this method, a 60% increase compared to 2018. The company is also involved in developing green bond markets through investment solutions coordinated with the International Finance Corporation (IFC), European Investment Bank (EIB) and Asian Infrastructure Investment Bank (AIIB); as well as participating in European projects related to ESG regulation, disclosure and taxonomy (Amundi, 2020a).

Amundi also considers a responsibility applying sustainable development principles to its operations; mainly by managing its environmental impact and organising solidarity events. Most important initiatives include the 'Give a Hand' programme to support charitable projects selected by employees; internal collection of clothes and toys for donation; and employee participation in the Challenge Against Hunger. Additional local projects related to humanitarian help, environmental conservation, education and culture are supported; for which an overall budget of EUR 2.3 million was assigned in 2019. CSR monitor and ESG analysis is assigned to a team of 30 specialists assessing the firm's portfolio and supporting businesses to improve their practices. There is also a team dedicated to Amundi's voting and commitment policy, which includes environmental and social criteria and is updated annually to increase commitments to lower-carbon economies. These teams are monitored by the firm's CEO and organise their work in committees dedicated to strategy definition, rating, voting policy and social impact.

Overall, Amundi's CSR policy is based on ethical and instrumental motivations as its follows organisational principles that also shape its growing strategy. Focus is placed on contributions through its commercial options and operations. It also includes altruistic characteristics by financing philanthropic initiatives in all its locations. In terms of reporting, Amundi is not legally required to issue a non-financial report as this obligation corresponds to its parent company. However, it does so voluntarily. The scope of its disclosure includes the Amundi Group (French headquarters and all subsidiaries with over 100 employees). Its environmental section includes data from Amundi's headquarters and subsidiaries in France, UK, Italy Ireland, Austria, Germany, Japan and USA (covering 89% of global headcount); extrapolating values for subsidiaries with less than 100 employees. Its reporting motivations are not legal or economic but conventional; responding to the firm's principles and stakeholder expectations. The report has a comprehensive scope of analysis in terms of topics and corporate boundaries but does not rely on a specific framework or external assurers, as it follows practices implemented by Crédit Agricole.

Waste Management Policies and Practices

Amundi's operations do not have a major direct environmental impact. However, the company applies its CSR principles to all activities in order to manage its facilities and resources responsibly and control CO_2 emissions. Initiatives specifically related to WM correspond to two CSR commitments: acting as a responsible financial institution and being a community-minded, eco-aware citizen.

Amundi follows GHG Protocol to calculate its carbon footprint. As it does not generate significant volume of 'scope 1' emissions, its main sources of carbon emissions relate to energy consumption and business travel ('scope 2'). Its management strategy is to control current volumes and implement mechanisms to reduce them, with initial measures introduced in 2016 to transition to renewable energy sources. This has gradually led to powering all facilities in Paris using electricity generated from renewable sources, mainly hydro-electric, as well as increasing the share of green energy consumption in Germany and installing solar panels in Italy. In 2019 Amundi joined Livelihoods' carbon offset scheme dedicated to financing agroforestry, rural energy and ecosystem restoration projects. To improve its energy efficiency, measures taken include reducing the operating times of air treatment units, switching from traditional to LED lighting and using window contacts to pause fans when windows are open. In 2019, these actions allowed an increase of 5% in energy savings. In addition, Paris buildings, required to comply with environmental standards, undergo regular audits by local authorities; while facilities in Munich, Boston and Milan have been certified as 'Leadership in Energy and Environmental Design' (LEED) premises. Focus is also placed on IT systems and devices. In this sense, supplies are selected based on their electrical consumption and heat dissipation characteristics; while user equipment must comply with international energy efficiency standards. As a result, Amundi has maintained its electricity consumption levels stable since 2012 despite increasing the processing power delivered from suppliers.

To improve travel-related emissions, the company increased control measures and requires employees to validate the need to travel and receive prior authorisation for travelling abroad. When approved, rail options are mandatory for journeys lasting under three hours and weekly reporting of upcoming travel needs to be communicated to the Executive Committee. To reduce emissions linked to employee commute, Amundi encourages the use of public transport services or bicycles, and most entities offer work-from-home options. In France, 80% of public transport expenses are covered by Amundi and a carpooling platform was introduced, while in USA alternative commuting trains are available and electrical charging points were installed in its parking. Finally, corporate company cars are selected favouring fuel-efficient and hybrid models.

Initiatives related to 'scope 3' emissions are included in Amundi's responsible purchasing policy, based on UN's Global Compact, the Diversity Charter and the Charter on the Mediation of Responsible Supplier Relations principles. The policy integrates environmental and social issues to procurement procedures and encourages suppliers to improve their own sustainability practices. As an example, CSR performance's weight was increased to 15% of overall supplier's rating (previously 5% or 10%). For 'scope 3' emissions associated to clients, Amundi seeks to support their energy transition and commitment to a low-carbon economy through its asset options. These include investing in low-carbon index solutions,

green bond funds, thematic funds and Amundi Energy Transition (AET); a joint management company offering investments in real assets associated to renewable energy production and promotion of energy efficiency. These alternatives also reduce Amundi's portfolio carbon footprint by reducing the share of issuers responsible for significant volumes of emissions.

Regarding solid waste, Amundi's actions focus on selective sorting, recycling and raising employee awareness through its 'cleaning week' scheme. Its policy involves sending all collected waste for recycling to an external sheltered workshop employing people with disabilities. An exception applies to IT equipment; recycled by the service provider. Amundi's most successful initiatives relate to plastic use reduction after installing water dispensers with microfiltration systems and giving employees aluminium bottles (reducing the use of 4,000 plastic bottles per month); and replacing coffee and water cups with eco-friendly alternatives (reducing 3.5 tonnes of plastic waste per year). For paper, the objective is to reduce its use by promoting responsible management and recycling, as well as increasing the availability of electronic documents and invoicing. To improve paper efficiency, actions in place include setting double-sided printing and using certified low-weight paper. Latest policy updates include expanding the type of waste collected for recycling (caps, cigarette butts and coffee capsules) and introducing biodegradable materials to cafeterias. In addition, a waste-to-energy initiative was designed to collect biowaste and treating grease traps internally and reduce waste generated for disposal. Finally, Amundi has no specific policy regarding water management, consumption or wastewater treatment.

Despite not generating large volumes of waste directly, Amundi's approach to WM is focused, internally, on an efficient use of energy, paper and plastic; while externally on improving 'scope 3' emissions through sustainable investment portfolios for its clients. It represents a control approach supported by a preventive ambition towards future waste generation. As to its specific strategies, these prioritise waste reduction and are complemented by recovery options. As a result, all techniques within the 'waste hierarchy' proposal are applied, with efforts mostly directed to reducing, reusing and recycling waste.

Results and Assessment

Amundi monitors its performance using quantifiable metrics, mainly of volume and weight, but does not set specific targets or milestones to work towards to. As shown in Table 10, in 2019 best results were relate to solid waste, specifically in terms of generation of non-recyclable waste and volume of recycled paper; while indirect contributions to waste recycling via charitable and solidarity funding was the indicator that increased the most. In terms of emissions, its main advances relate to the increase in carbon footprint calculation of managed assets, followed by reductions in energy consumption, carbon emissions and an increase in the share of renewable energy consumed. In addition, despite train travel and related emissions increased, this can be associated to the firm's objective of prioritising this type of transportation over private vehicles and, as such. the 16% increase may reflect the policies' effectiveness. There were also improvements in the total volume of generated waste and water consumption, with a 4% and 3% reduction respectively. On the other hand, metrics reflecting slight deteriorations include total paper consumption and the increase in carbon emissions associated to train travel.

Indicator	Target	2019 Performance
Emissions		
Energy consumption (MWh)	-	23,663.1 (5% decrease)
Proportion of green energy (%)	-	50 (3% increase)
Total emissions (tonnes CO_2eq)	-	3,745.2 (3% decrease)
CO_2 emissions, train travel (tonnes CO_2eq)	-	238.1 (16% increase)
CO_2 emissions, air travel (tonnes CO_2eq)	-	7,771.1 (3% decrease)
Business travel: train (km)	-	5,283,477 (16% increase)
Air travel (km)	-	27,786,027 (2% decrease)
Portfolio assets subject to carbon footprint calculation (EUR billion)	-	545 (14% increase)
Carbon emissions in millions of euros invested (tonnes of CO_2eq)	-	149.1 (2% decrease)
Solid Waste		
Total waste (tonnes)	-	278.5 (4% decrease)
Paper consumption (tonnes)	-	379 (12% increase)
Non-recyclable waste (tonnes)	-	85 (25% decrease)
Recycled waste; excl. paper (tonnes)	-	33.3 (4% increase)
Recycled paper (tonnes)	-	160.2 (11% increase)
Recycled waste (via solidarity projects) (tonnes)	-	137,345 (667% increase)
Water		
Water consumption (m3)	-	36,573 (3% decrease)

Table 10. Amundi's Waste Management Performance

Source: Own elaboration based on Amundi (2020d)

4.2. Consolidated Results

After reviewing companies individually, consolidated results firstly concentrate on findings related to the sample's approach to WM and specific techniques used for each type of waste. The second part focuses on measurement techniques and performance. In this section, a cross-case analysis is carried out for six indicators covering all types of waste and reported identically by the four companies, as well as their performance in CK's ranking and KPIs related to waste management.

Regarding companies' approach and techniques used, the first observation is companies place carbon footprint as the main focus and priority, implementing actions that target their emissions and energy efficiency or consumption. They also have a comprehensive approach

towards solid waste in terms of type (food, paper, plastic, glass, metal) and management technique. But this contrasts with the efforts directed to water, as although they all monitor and report water consumption, only two companies implemented actions to reduce or improve its use (Ørsted and Chr. Hansen, the first two companies in CK's ranking). Regarding the approach and techniques used, all companies favour a preventive one and manifest a commitment to improve their environmental performance and support global initiatives; sharing concerns related to future sustainability. Waste generation and management is aligned with a circular-economy mindset, resulting in the combination of techniques proposed in the 'waste hierarchy' system and prioritising the top ones (reduction, reuse and recovery).

Reduction techniques are mainly applied to manage emissions and energy use. All companies are transitioning from the use of fossil fuels to renewable energy sources by producing it internally or buying it from certified suppliers. In Ørsted's case, it also represents its business development strategy. Solar energy is the most used type of green power, as companies have installed panels in production sites, office facilities and stores; followed by wind-generated power. To improve their energy efficiency, all companies have switched to LED lighting systems and certified technology equipment. EMS or building certification is not a shared priority, but when pursued they opt for ISO 14001. Another common practice is the discouragement of business travel and preference for online meetings, as well as replacing existing corporate fleet with electric or hybrid options. Regarding 'scope 3' emissions, all companies introduced sustainability requirements to their procurement activities and suppliers' contracts, promoting they also improve their eco-efficiency and receive ratings, trading and audits from the hiring partner. But companies focus their efforts on different emissions' 'scopes', targeting the type one they produce the most: Ørsted focuses on 'scope 1', Kesko and Chr. Hansen on 'scope 2' and Amundi on energy efficiency and 'scope 3' because its operations do not have major environmental impact.

To manage solid waste, companies rely on a combination of reuse, recycle and recovery actions. This results in a variety of programmes involving internal waste sorting and receiving clients' waste, later sent to external processing companies. All firms have plastic and paper recycling schemes in place, in addition to which some also collect glass, metal, coffee capsules and bottle caps. Another common practice is sorting food waste to produce biogas, preferably to be used by the same company to consequently improve its energy efficiency. To reduce plastic consumption, companies have redesigned or simplified packaging and materials used, as well as replaced single-use plastic cups and bottles with biodegradable or reusable ones. To save paper, measures include expanding the use of electronic documents and adjusting printing settings.

In terms of water management, companies mainly opt for monitoring current consumption levels and assessing its sourcing rather than launching programmes to treat wastewater or reduce water use (with the exception of Chr. Hansen). This represents a controlling approach, in contrast with the preventive one applied to the other types of waste.

4.2.1 Performance Metrics

To measure their progress, all companies opt for quantifiable metrics as they are relatively easier to calculate and understandable by any stakeholder reading the report. Specifically for emissions, all companies follow GHG Protocol standards and apply a comprehensive scope of analysis that contemplates direct and indirect emissions. All sustainability reports reviewed present volume metrics on an annual basis. However, progress is not frequently measured against specific targets for each type of waste . Table 11 presents a summary with results for each type of waste, CK's KPIs performance and key company information.

	Ørsted	**Chr. Hansen**	**Kesko**	**Amundi**
Emissions (tonnes CO_{2e})	36,573,000 (8% decrease)	139,793 (1% increase)	8,139,365 (17% decrease)	3,745 (3% decrease)
Energy used (MWh)	17,558,000 (25% decrease)	205,691 (2% decrease)	940,161 (no variation)	23,661 (5% decrease)
Total Waste (tonnes)	138,000 (32% decrease)	4,720 (7% increase)	33,739 (8% increase)	278 (4% decrease)
Recycled waste (tonnes)	115,930 (7% increase)	2,148 (4% increase)	27,930 (10% increase)	194 (10% increase)
Recycled waste (% total)	84%	40%	83%	70%
Water used (m^3)	882,000 (16% decrease)	1,490,702 (1% decrease)	1,193,745 (no variation)	36,573 (3% decrease)
CK ranking's position	1st	2nd	99th	100th
Score in WM KPIs	60%	59%	30%	21%
Clean revenue	93%	100%	50%	19%
Resource mgt.	80%	36% (71%)	51%	65% (81%)
Sustainability Pay Link	100%	100%	0%	100%
Times included in the ranking	3	3	16	3
Country	Denmark	Denmark	Finland	France
Industry	Energy	Bioscience	Retail	Finance
Revenue (EUR)	9.1 billion	1.2 billion	13 billion	2.7 billion
Employee headcount	6,500	3,600	43,000	4,500

Table 11. Consolidated Results' Summary

Source: Own elaboration based on companies' and CK's reports

Table 11 shows all firms improved their waste management performance by reducing emissions, energy used and increasing recycled solid waste; but volumes vary significantly. When considering annual variations, no trend is observable within the sample. Ørsted achieved significant improvements in energy used and total waste generated, with a 25% and 32% decrease respectively. Chr. Hansen's average change in metrics was 3%, with its highest one actually representing a deterioration by increasing 7% of waste generation; while Kesko did well for emissions' reduction (17%) and recycled waste (10%) but made no improvements in energy and water consumption. Finally, Amundi improved all metrics at an average of 5%, with its best result being a 10% increase in recycled waste. Regarding recycled waste, even though maximum annual variation in all companies is 10% this represents around 80% of total waste generated by the firms (except for Chr. Hansen, 40%); complemented in Kesko's and Amundi's cases with recycling waste returned by clients.

Excluding water values, the volume of waste reported by each company is consistent with its sector and type of operations. In this sense, most waste is produced by Ørsted for being an energy-generating company, followed by Kesko and Chr. Hansen due to the network of stores and trading of products; and lastly Amundi for being a service sector firm. This also influences the type of waste generated and management technique prioritised: Ørsted focuses on energy consumed (and type) and emissions; Chr. and Kesko on solid waste and Amundi on efficiency and recycling.

When considering Corporate Knight's assessment, final WM scores are consistent with companies' position in the Global 100 list. These values were calculated following the weight previously presented: 50% for clean revenue, 10% for resource management and 5% for sustainability pay link (SPL). In terms of results, the first two companies obtained a score that at least doubles that of the last two firms. When looking at KPIs individually, figures for clean revenue also reflect a clear difference between the two top and bottom firms; but in this case Chr. Hansen (2nd position) obtained a better result than Ørsted (1st). The score for resource management is dissimilar among companies. Ørsted obtained the best score with 80%, followed by Amundi (100th in the list) with 65%, Kesko (99th) with 51% and finally Chr. Hansen; with a much lower score of 36%. These differences are caused by firms' performance but also because this KPI results from the combination of up to eight indicators defined for each industry group (which is why CK compares companies with its peers). Values in the table include those applicable to each company, representing all indicators for Chr. Hansen and at least five for the remaining firms. In addition, CK gives a score of 0% to indicators that apply to a company's industry but for which it did not disclosed information. This specifically affected Chr. Hansen's and Amundi's scores, as values using only the information available show a better performance (figures within brackets). Finally, scores for SPL are equal for all companies except Kesko. Within CK's methodology, SPL is the only KPI without percentual grading. Companies are awarded 100% if they report having a mechanism that specifically links senior executive remuneration to the achievement of sustainability targets; or 0% if otherwise.

Differences in WM performance may respond to factors like company size and industry, but also to its traditional approach to waste; considering, e.g., Chr. Hansen has had a CSR and WM policy since 1949, Kesko has been part of CK's ranking since its first edition and Amundi designed its operations on sustainable standards since its foundation; while Ørsted

improvements reflect its transition from a traditional energy company to a 'green' energy one. However, studying the reasons for differences in results is beyond this thesis' analysis scope. Its mention is meant as an observation that despite applying similar techniques results are not the same across companies for reasons not necessarily related to the WM plan alone.

Finally, assessing companies based on the number of times they were included in CK's ranking is risky because this does not only depend on their performance but also on the magazines' methodology. Kesko is the only one included since the first Global 100 publication, with a fluctuating rank that reached its highest position in 2015 (5^{th})[4]. The remaining companies have all been part of the ranking since 2018, but here it is worth mentioning their individual progress. Ørsted became a public company in 2016 and after being included in the Global 100 list two years later it has improved its performance each year (70^{th}, 4^{th} and 1^{st} positions respectively). Chr. Hansen became a public company in 2010 and was included in the ranking almost a decade later, but also managed to enhance its results since (66^{th} position in 2018, 1^{st} in 2019 and 2^{nd} in 2020). Amundi's case differs because it was founded five years after CK started publishing the Global 100 list (2005) and became public in 2015. Although it was included in the ranking two years after meeting the qualifying criteria, its performance has deteriorated by holding the 6^{th}, 31^{st} and 100^{th} position in each consecutive edition. But variations in positions need to be assessed carefully as they depend on each firms' performance but also that of other qualifying firms, so they not necessarily represent a regression in the quality of their policies if, e.g., their peers improved their performance. In addition, in relation to the thesis' topic it is important to bear in mind the ranking's final score and position depends on a comprehensive analysis that goes beyond waste management.

Overall findings can be summarised as shown in Table 12, including identified 'best practices' related to WM and CSR policy design. Measurement techniques included in the table are those applied by all reviewed companies, however the total number of metrics used depends on firms' CSR design and specific initiatives related to waste management.

Waste Management		
Type of Waste	Management Technique	Measurement Method
Emissions	• Increase the use of renewable energy, by installing solar panels or buying from certified external providers • Reduce business travel, promoting online meetings • Include sustainability criteria in procurement, requiring suppliers to disclose their WM policies and allow audits or trainings	• Tonnes of CO_2 and other applicable GHG gases

[4] For the period 2010-2020. Firms' positions in previous editions is not available.

Type of Waste	Management Technique	Measurement Method
Energy Management	• Reduce the use of air conditioning systems • Use LED lighting systems • Buy supplies and IT equipment certified for energy efficiency	• Total consumption (MWh) • Proportion of green energy (% of total) • Energy efficiency (MWh savings)
Solid Waste	• Sort and recycle plastic, paper and glass (externally) • Use organic food waste in recovery processes to generate energy and biogas • Replace single-use plastic items with eco-friendly/biodegradable materials or reusable materials and products	• Total waste produced (tonnes) • Hazardous waste, if applicable (% of total) • Total recycled waste (tonnes) • Proportion of recycled waste (% of total)
Water	No common WM technique, companies focus on monitoring water usage	• Total consumption (m^3)
CSR Policy and Reporting		
• Design CSR policies based on UN's SDGs and Global Compact principles • Assess emissions using the GHG protocol framework as reference • Report CSR performance comprehensively, considering global operations and subsidiaries (if applicable) • Perform external audits to sustainability reports before disclosure		

Table 12. 'Best practices' Summary

Source: Own elaboration

5. CONCLUSIONS

The thesis' objective was to analyse waste management practices implemented by MNCs classified as sustainability leaders to, specifically, identify 'best practices', which type of waste they target most and how they measure their performance. Additionally, to compare companies' approach to the topic and obtain insights on the drivers for adopting WM practices. The applied method for reaching the objective was a qualitative content analysis of their latest sustainability reports. The studied sample was selected from Corporate Knight's Global 100 sustainability ranking and included the first and last two companies in the list: Ørsted A/S, Chr. Hansen Holding A/S, Kesko Corporation and Amundi SA. Based on this, the following conclusions can be extracted.

Results show all reviewed companies have a comprehensive waste management policy in place, mainly oriented towards carbon emissions and solid waste. Despite differences in country of origin, industry, annual revenue and employee headcount, they share a similar

approach to the issue, techniques used, measurement method and waste consideration by type instead of potential utility (Nikolaou, Shaun, & Skouloudis, 2018). In this sense, firms are aligned despite being on opposite ends of CK's ranking.

Regarding the specific practices leading sustainability MNCs apply (first research question), these can be grouped by type of waste. For emissions, techniques used to improve companies' energy efficiency include reducing the use of air conditioning systems, using LED lighting options and buying certified technology equipment. To reduce carbon emissions, preferred initiatives are discouraging business travel (especially by air) and transitioning the type of energy used to power operations to favour renewable sources. For this, companies either install solar panels in its facilities or buy certified energy from external providers. Another common practice within the sample is the implementation of procurement and supplier requirements containing sustainability criteria (e.g., allowing audits, proving waste management policies in place) to promote sustainable corporate behaviour of business partners. Techniques used for solid waste are sorting and recycling used plastic, paper, glass, and food; the latter to be used in waste-to-energy processes and biogas generation (Cheremisinoff, 2003). Finally, no common technique was identified for water management or wastewater treatment; as companies focus on monitoring and reducing volume of water used. The only company in the sample with a comprehensive treatment policy in place is Chr. Hansen and applies reverse osmosis, nanofiltration and clean-in-place optimisation techniques. With the exception of water treatment, techniques used are aligned with the 'waste hierarchy' propositions and the objective of reducing waste generation to improve firms' environmental impact as well as achieve sustainable growth (CheaperWaste, 2020).

As to the second question, of which type of corporate waste MNCs prioritise, the analysis shows the main one is emissions (considering direct and indirect emissions' volume, as well as energy consumption), followed by solid waste. Solid waste practices are widely applied, and generally easier to implement compared to those focusing on emissions because these require restructuring operations to use or generate renewable energy; also frequently involving larger investment costs and time adaptations (Cheremisinoff & Bendavid-Va, 2001). In contrast, solid waste sorting and collection is easier and cheaper because companies frequently deliver waste to external recycling companies for its processing. In line with findings about the type of techniques applied, wastewater is the least treated type of waste and companies even reflect a different approach towards it compared to emissions and solid waste. In this sense, they have a policy closer to waste control rather than prevention (Cheremisinoff, 2003).

In terms of results' measurement method (third research question), all companies base their progress assessment on quantifiable metrics and indicators (Zorpas & Lasaridi, 2013); mostly tonnes (for emissions and solid waste), MWh (for energy consumption) and cubic metres (for water used and wastewater discharged). To measure progress, values are mainly evaluated on a year-to-year basis and not against specific targets for each metric. The depth and detail of analysis varies among companies depending on the total number of metrics used but, in all cases, results are reported for each type of waste and include at least total volume of waste generated and proportion of recycled output.

The fourth question focuses on the similarities and differences within the sample in terms of approach to the topic, chosen policies and results. The analysis shows companies share a

generally preventive approach towards waste management and a commitment to work towards more sustainable operations and corporate performance (Cheremisinoff, 2003). In practice, they all implement similar techniques like transitioning to renewable energy power, recycling solid waste, and having policies that target indirect emissions linked to supply chain operations. In terms of results, they all have achieved a positive overall performance in their indicators. On the other hand, differences can be identified in the type of waste each company prioritises through its initiatives (Woodard & Curran, 2006), mainly linked to the type of waste they generate. Another difference relates to the relative progress presented in their disclosures compared to the previous year's results.

Placing findings within the wider topic of sustainability and CSR, analysed companies show a commitment to the stakeholder theory of businesses by acknowledging in their reports that their responsibility goes beyond their corporate boundaries, including sustainability values and objectives in their development strategies (Mackey, 2018). They have all designed CSR programmes strategically by combining sustainability principles and economic motivators; considering profit needs to be generated in a way that contemplates business operations' impact and contributions to its surrounding environment and communities (Jonker & de Witte, 2006). In addition, they conceive their sustainability reports as a tool for communicating with stakeholders and attracting investors (Guthrie, 2016). This is why they describe corporate motivations, actions in place and their results. To ensure their disclosures' credibility companies rely on scientific and international forums about climate change to design their CSR policies, especially UN's SGDs and Global Compact principles; and on external audits to confirm their performance results. And despite most of the studied companies are legally required to publish a non-financial report, they had all a CSR policy and disclosure practice in place before the obligation was approved in 2014 (EU's Directive). In Amundi's case, the disclosure is entirely voluntary as the requirement does not apply to subsidiaries (European Union, 2014). In terms of reporting structure, all firms adopt a TBL approach but do not follow the same framework: Ørsted relies on TCFD recommendations, Chr. Hansen on the combination of five platforms' guidelines, Kesko on GRI standards and Amundi on its parent company's internally-developed system.

Overall, the study met its objective and also contributes to existing research on corporate sustainability motivations, practices and results; specifically, on that of waste management from a comprehensive perspective by not only focusing on a specific type of waste, allowing assessment at a corporate level. However, it is specific in that it focuses on one aspect of CSR rather than its whole scope of application (i.e., excluding HR policies, social issues or corporate governance). It describes policies used by companies ranked as 'most sustainable', who share similar preferences to manage corporate waste. Because they rely on international environmental standards and are distinguished as corporate sustainability leaders, the described initiatives can be considered 'best practices' and a reference to companies planning to introduce or improve their waste management policy. Thus, managers willing to be more sustainable in terms of WM should consider the analysis of these companies to have examples on how to implement, measure and improve their performance in this field.

However, results need to be considered keeping in mind the size and composition of the studied sample, made up of four public and large multinational companies. In addition,

resulting from the source of the sample, all selected companies are European and categorised as sustainability leaders; which also potentially biases the investigation about waste management practices in general. Considering this, findings cannot be generalised to a broader geographical and cultural context, or other type of corporations (e.g., private and SMEs). Regarding the information used, given the lack of agreed content and structure of sustainability reports the ones reviewed did not always include the same information or presented it in the same way. Based on this, future research could be based on a larger and more heterogeneous sample; and also define a way to standardise sustainability reports to allow an easier comparison of waste management practices. Within the topic of WM, research could focus on practices and motivations (or lack of) related to water use and wastewater management.

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ANNEXES

Annex A: Corporate Knight's KPI List

1. Clean Revenue	Percentage of revenue derived from 'clean' products and services, according to Corporate Knights' taxonomy
2. Sanction Deductions	Total fines penalties and settlements divided by revenue
3. Energy productivity	Revenue divided by (energy use - renewable energy generated by the company or certified RECs)
4. GHG Productivity	Revenue divided by GHG emissions ('scope' 1 and 2)
5. Water Productivity	Revenue divided by water use
6. Waste Productivity	Revenue divided by non-recycled/reused waste generated
7. VOC Productivity	Revenue divided by VOC emissions
8. NOx Productivity	Revenue divided by NOx emissions
9. SOx Productivity	Revenue divided by SOx emissions
10. PM Productivity	Revenue divided by PM emissions
11. Innovation Capacity	R&D expenses divided by revenue (three year trailing)
12. Percentage Tax Paid	Cash tax amount paid divided by EBITDA (five year trailing)
13. Highest Paid Employee – Av. Pay	Highest paid employee compensation divided by average compensation
14. Pension Fund Status	75%*(total DB + DC ER contributions/FTE EE) + 25%*(fair value of DB assets/FTE EE) – (1 – (fair value of DB assets/liability)); percentile-ranked against peers
15. Supplier Sustainability Score	Weighted CK Sustainability Score of a company's largest publicly listed supplier
16. Injuries	Lost time incidents rate
17. Fatalities	Fatalities divided by total number of FTE
18. Employee Turnover	Number of departures divided by average total employees
19. Women in Executive Management	Women representation in executive management teams (percentile-ranked against all companies in the universe)
20. Women on Boards	Women representation on board of directors (percentile-ranked against all companies in the universe)
21. Sustainability Pay Link	Mechanisms that link senior executive pay to sustainability targets

Table 13. CK's KPIs

Source: Own elaboration based on CK (2019)

Annex B: UN's Sustainable Development Goals (SDGs)

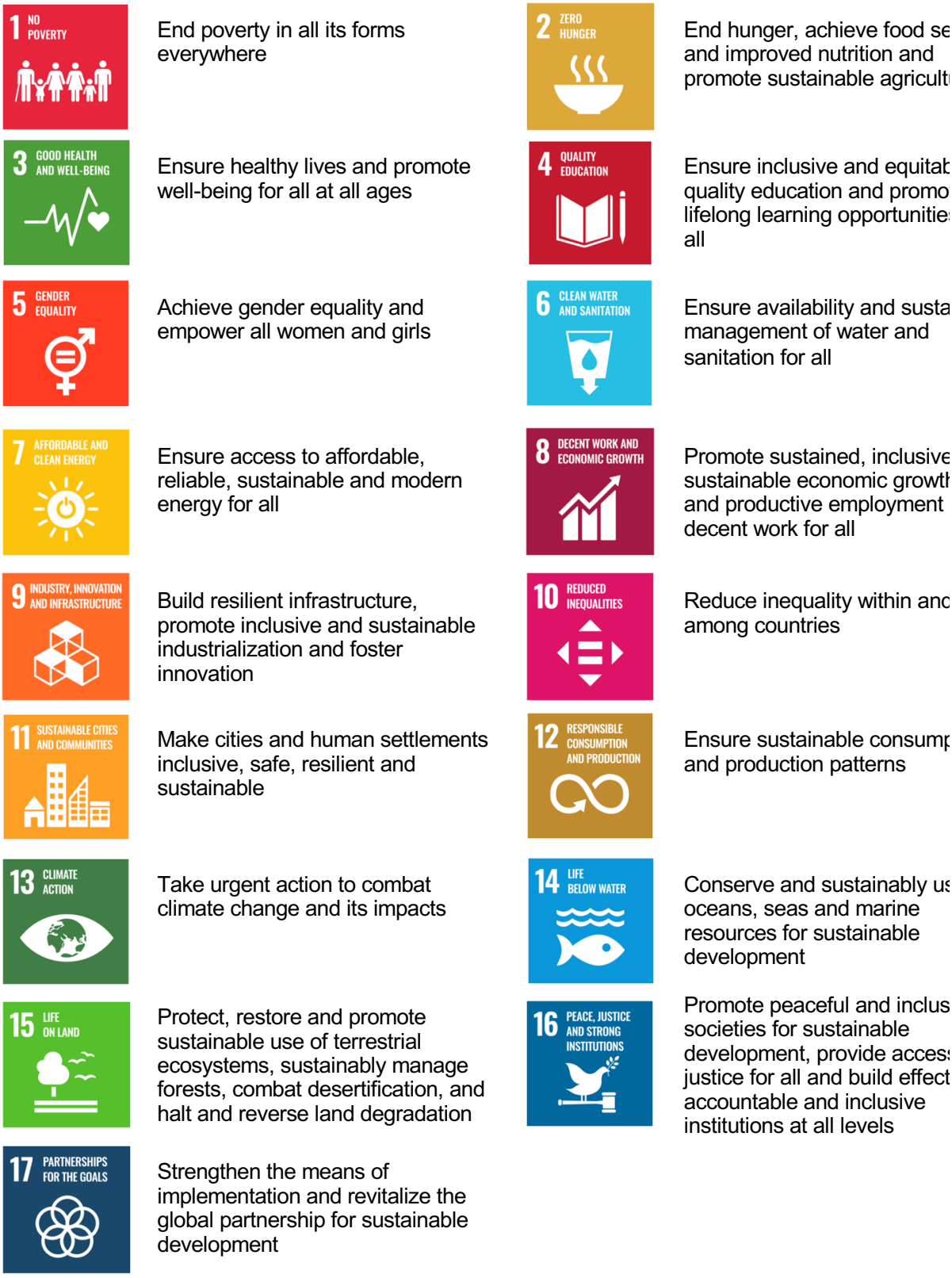

Figure 3. UN's SGDs

Source: UN (2020)